CLAIMS

1. A semiconductor device, comprising:

a source-drain diffusion layer formed in a semiconductor substrate;

a first silicide film formed on the source-drain diffusion layer;

a gate electrode formed on a gate insulating film positioned on the semiconductor substrate; and

a second silicide film positioned on the gate electrode and thicker than the first silicide film.

2. The semiconductor device according to claim 1, wherein said second silicide film formed on the gate electrode is at least 1.2 times as thick as the first silicide film formed on the source-drain diffusion layers.

3. The semiconductor device according to claim 1, wherein at least one of said fluorine, nitrogen and oxygen atoms is present in at least one of said first silicide film, and said source-drain diffusion layer.

4. The semiconductor device according to claim 1, wherein a silicon nitride film is formed on the entire surface of said semiconductor substrate including said first silicide film and excluding said second silicide film.

5. The semiconductor device according to claim 1, wherein at least one of germanium (Ge), boron (B), silicon (Si), arsenic (As), and antimony (Sb) atoms is

present in at least one of said second silicide film and said gate electrode.

6. The semiconductor device according to claim 1, wherein a gate side wall film is formed on the side surface of said gate electrode.

7. The semiconductor device according to claim 1, wherein said source-drain diffusion layer comprises a shallow diffusion layer and a deep diffusion layer to form an LLD (Lightly Doped Drain) structure.

8. The semiconductor device according to claim 1, wherein said gate electrode consists of a polycrystalline silicon film.

9. A method of manufacturing a semiconductor device, comprising:

the step of forming a gate insulating film on a semiconductor substrate;

the step of forming a gate electrode on the gate insulating film;

the step of forming a source-drain diffusion layer in the semiconductor substrate;

the step of selectively introducing into the source-drain diffusion layer atoms which inhibit silicidation;

the step of forming a film of a metal having a high melting point on the gate electrode and on the source-drain diffusion layer; and

the step of converting the high melting point

metal film into a silicide film to form a silicide film selectively on the gate electrode and on the source-drain diffusion layer.

10. The method of manufacturing a semiconductor device according to claim 9, wherein said atoms serving to inhibit said silicidation is selected from the group consisting of fluorine, nitrogen and oxygen.

11. A method of manufacturing a semiconductor device, comprising:

the step of forming a gate insulating film on ~~a~~ semiconductor substrate;

the step of forming a gate electrode on the gate insulating film;

the step of forming a source-drain diffusion layer in the semiconductor substrate;

the step of forming a film which inhibits silicidation on the source-drain diffusion layer;

the step of forming a film of a metal having a high melting point on the gate electrode and on the source-drain diffusion layer; and

the step of converting the film of the high melting point metal into a silicide film to form a silicide film selectively on the gate electrode and on the source-drain diffusion layer.

12. The method of manufacturing a semiconductor device according to claim 11, wherein said film serving to inhibit said silicidation is selected from the group

consisting of an oxide film and a nitride film.

13. A method of manufacturing a semiconductor device, comprising:

the step of forming a gate insulating film on a semiconductor substrate;

the step of forming a gate electrode on the gate insulating film;

the step of forming a source-drain diffusion layer in the semiconductor substrate;

the step of forming an insulating film on the gate electrode and on the source-drain diffusion layer;

the step of thinning the insulating film so as to expose the surface of the gate electrode with the source-drain diffusion layer kept covered with the insulating film;

the step of introducing atoms into a region around the surface of the gate electrode so as to make the upper portion of the gate electrode amorphous;

the step of removing the insulating film positioned on the source-drain diffusion layer;

the step of forming a film of a metal having a high melting point on the gate electrode and on the source-drain diffusion layer; and

the step of converting the film of the high melting point metal into a silicide film to form a silicide film selectively on the gate electrode and on the source-drain diffusion layer.

14. The method of manufacturing a semiconductor device according to claim 13, wherein said atoms introduced into a surface region of said gate electrode are selected from the group consisting of boron, germanium, silicon, arsenic and antimony.

15. A method of manufacturing a semiconductor device, comprising:

the step of forming a gate insulating film on a semiconductor substrate;

the step of forming an amorphous silicon film having a shape of a gate electrode on the gate insulating film;

the step of forming a source-drain diffusion layer in the semiconductor substrate;

the step of forming a film of a metal having a high melting point on the amorphous silicon film and on the source-drain diffusion layer; and

the step of converting the film of the high melting point metal into a silicide film to form a silicide film selectively on the amorphous silicon film and on the source-drain diffusion layer.

16. The method of manufacturing a semiconductor device according to claim 15, wherein said step of forming said silicide film comprises a heat treatment for converting said film of a high melting point metal into a silicide film, and said amorphous silicon film is converted into a polycrystalline silicon film by

said heat treatment.

17. A method of manufacturing a semiconductor device, comprising:

the step of forming a gate insulating film on a semiconductor substrate;

the step of forming a gate electrode on the gate insulating film;

the step of forming a source-drain diffusion layer in the semiconductor substrate;

the step of forming a silicide film selectively on the gate electrode and on the source-drain diffusion layer;

the step of forming an insulating film on the silicide film positioned on the gate electrode and on the source-drain diffusion layer;

the step of thinning the insulating film to expose the surface of the silicide film positioned on the gate electrode with the silicide film, which is positioned on the source-drain diffusion layer, kept covered with the insulating film; and

the step of further forming a silicide film on the surface of the exposed silicide film.

18. A method of manufacturing a semiconductor device, comprising:

the step of forming a gate insulating film on a semiconductor substrate;

the step of forming a gate electrode on the gate

insulating film;

the step of forming a source-drain diffusion layer in the semiconductor substrate;

the step of forming a film of a metal having a high melting point on the gate electrode and on the source-drain diffusion layer;

the step of converting the film of the high melting point metal into a silicide film so as to form a silicide film selectively on the gate electrode and on the source-drain diffusion layer;

the step of forming an insulating film on the silicide film positioned on the gate electrode and on the source-drain diffusion layer;

the step of thinning the insulating film to expose the surface of the silicide film positioned on the gate electrode with the silicide film, which is positioned on the source-drain diffusion layer, kept covered with the insulating film;

the step of forming a film of a high melting point metal on the silicide film positioned on the gate electrode; and

the step of converting the film of the high melting point metal into a silicide film so as to form a silicide film selectively on the silicide film formed previously on the gate electrode.

19. The semiconductor device according to any one of claims 9, 11, 13, 15, 17, and 18, wherein said

silicide film formed on said gate electrode is at least 1.2 times as thick as the silicide film formed on the source-drain diffusion layer.